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07/963,656 07/19/90 APT. 101/101M

EXAMINER

LEE, J.

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ART UNIT

PAPER NUMBER

9

12/01/93

DATE MAILED:

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

12/01/93

 This application has been examined Responsive to communication filed on 12/02/93 This action is made final.A shortened statutory period for response to this action is set to expire 3 month(s), _____ days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133**Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

- Notice of References Cited by Examiner, PTO-892.
- Notice of Art Cited by Applicant, PTO-1449.
- Information on How to Effect Drawing Changes, PTO-1474.
- Notice of Draftsman's Patent Drawing Review, PTO-948.
- Notice of Informal Patent Application, PTO-152.
- _____

Part II SUMMARY OF ACTION1. Claims 1-16 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. Claims _____ have been cancelled.3. Claims _____ are allowed.4. Claims 1-16 are rejected.5. Claims _____ are objected to.6. Claims _____ are subject to restriction or election requirement.7. This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.8. Formal drawings are required in response to this Office action.9. The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are acceptable; not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).10. The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been approved by the examiner; disapproved by the examiner (see explanation).11. The proposed drawing correction, filed _____, has been approved; disapproved (see explanation).12. Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has been received not been received been filed in parent application, serial no. _____; filed on _____.13. Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.14. Other**EXAMINER'S ACTION**

Serial No. 07/963,056

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Applicant's communication, filed December 2, 1993, has been carefully considered by the Examiner. The arguments advanced therein, considered together with the amendments made to claim 1, are persuasive and the rejections of record are hereby withdrawn. In view of further search, however, and the consequent discovery of previously uncited references, new rejections are set forth below.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 5, 9, and 13 are rejected under 35 U.S.C. § 103 as being unpatentable over Aoyama et al (Japanese Kokai No. 53-29740). Aoyama et al discloses a junction between two optical fibers which propagate light in a preselected direction, the junction being formed to include a notch in the outer wall of one of the fibers. This notch serves to redirect a portion of the light propagating in the preselected direction in a direction that is orthogonal to the preselected direction (see figure 1). Just as in applicant's claimed arrangement, the principle of total internal reflection is employed to cause the redirection of the light portion in Aoyama et al through a side wall of the fiber. The only difference, then, between Aoyama et al and the claimed device is that Aoyama et al does not use a single optical fiber in forming the branching arrangement. It is clear, however,

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that identical optical principles would be involved whether the redirection of light is made to occur at an end junction or at some mid-point of the fiber. Since a plurality of light branching arrangements of the type shown by Aoyama et al are normally required in typical optical circuitry (e.g. in an optical LAN), and since the use of a single optical fiber would be highly desirable in such circuitry (since each junction introduces more losses into the system), it would have been obvious to the ordinarily skilled artisan to have employed the Aoyama et al technique with respect to a single optical fiber, forming one or more redirecting notches at various points along a single optical fiber to create a plurality of low-loss light branches. Each such branch would operate by means of total internal reflection.

Claims 2-4, 6-8, 10-12, and 14-16 are rejected under 35 U.S.C. § 103 as being unpatentable over Aoyama et al in view of Mori (U.S. Patent 4,690,490). Aoyama et al has been thoroughly discussed in the preceding paragraph. Mori (see figure 11) shows a light branching arrangement that operates on identical principles to that of Aoyama et al (i.e. total internal reflection), even though the inclined reflecting surfaces are not formed as notches in the outer wall of the main light conductor. Since the operating principles are the same, it would have been manifestly obvious to employ any teachings of Mori in the proposed multi-branching arrangement of Aoyama et al (as set

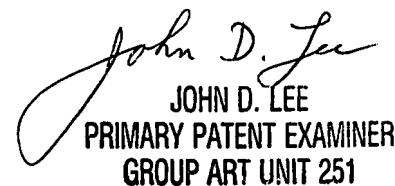
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forth above). In figure 11, Mori shows that the cross-sectional areas of reflecting surfaces increase with distance along the main optical conductor. In column 6, Mori further teaches that the amounts of branched light can be adjusted by changing the gaps between the branch sites. This means that it would have been entirely obvious to choose any spacing between successive reflecting surfaces. This would include successively decreasing spacing gaps along the main optical direction. As stated before, the application of this teaching in the proposed multi-branching arrangement of Aoyama et al (above) would have been obvious.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patent to Mulkey shows a disc-type optical waveguide having notches therein for out-coupling light by means of total internal reflection. The patent to Chang shows an arrangement for coupling between waveguides using internally formed slots which causes branching of light by means of total internal reflection.

Applicant's amendment necessitated the new grounds of rejection. This action could, accordingly, be made final (see M.P.E.P. § 706.07(a)). Such action is **not** taken, however, in order to give applicant an opportunity to respond to the new grounds of rejection.

Any inquiry concerning this communication should be directed to Examiner John D. Lee at telephone number (703) 308-4886.



JOHN D. LEE
PRIMARY PATENT EXAMINER
GROUP ART UNIT 251